



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants : Modak *et al.*

Appln. No. : 10/600,257 Examiner : Azpuru, Carlos A.

Filed : June 20, 2003 Group Art Unit : 1615

## For : ANTIMICROBIAL MEDICAL DEVICES

**DECLARATION OF SHANTA M. MODAK  
UNDER 37 C.F.R. § 1.132**

I hereby certify that this paper is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

March 21, 2005

**Date of Deposit**

Peter J. Shen

Attorney Name

52,217

PTO Registration No.

Signature

March 21, 2005  
Date of Signature

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, SHANTA M. MODAK, hereby declare as follows:

1. I am an inventor of the invention disclosed and claimed in the present United States patent application.

2. I am an employee of Columbia University which is the assignee of the present United States patent application.

3. Each of the pending claims requires treatment of a medical article with a solution having at least a combination of chlorhexidine free base and water-soluble chlorhexidine salt in a weight/weight ratio of between about 1:1 to about 1:5 (e.g., Claims 1, 17, 19, 38, 39, 51, 58, 65), greater than 1:1 (e.g., Claim 26) or are each in a weight/volume ratio of about 0.20 percent (e.g., Claim 11).

4. I have reviewed the Office Action mailed by the U.S. Patent and Trademark Office on December 21, 2004 for the present application. I have also reviewed United States Patent No. 6,261,271 to Solomon et al. ("Solomon"), which was cited by the Examiner in the December 21, 2004 Office Action.

5. Solomon was cited by the Examiner as a basis for an obviousness rejection under 35 U.S.C. § 103(a). I provide this declaration to explain why, in view of Solomon, one of ordinary skill in the art would not have reasonably expected that treating a medical article with a mixture of chlorhexidine free base and chlorhexidine salt could successfully result in a medical article exhibiting prolonged antimicrobial effectiveness.

6. Solomon relates to chlorhexidine-containing medical devices. Solomon's devices feature chlorhexidine bulk distributed throughout a polyurethane base layer which, in addition, may have a coating of chlorhexidine on the base layer. *See* Solomon, column 5 at lines 47-52 ("The article of the invention having bulk distributed chlorhexidine may be steeped in a solvent solution of chlorhexidine ... An effective coating of chlorhexidine may be obtained when the steeping solution contains from about 1-25%, preferably about 5-15% of chlorhexidine."). Solomon fails to disclose or suggest treating

medical articles with a solution containing, at least, chlorhexidine free base and chlorhexidine salt as required by the pending claims. Solomon also fails to disclose or suggest medical articles that are produced by such treatment.

7. We discovered that treatment of a medical article with a solution containing of chlorhexidine free base and chlorhexidine salt provides improved antimicrobial effectiveness. In particular, we discovered that such treatment surprisingly increased uptake of chlorhexidine into the medical article and consequently imparted to these medical articles surprisingly effective and prolonged microbial resistance. *See, e.g.*, United States Patent Appln. No. 10/600,257, ¶ 0011.

8. In fact, Solomon indicates that attempts to solve the very problem solved by the present invention - that is, adherence of an antibacterial agent to the plastic article - had been nothing but unsuccessful. *See* Solomon, column 1 at lines 45-46 and column 2 at lines 28-32 (“Many attempts to solve the problem of infection have been directed toward adherence of an antibacterial agent to the plastic article ... satisfactory solutions have not yet been disclosed, particularly for medical articles, such as catheters...”). Notably, Solomon does not use chlorhexidine free base and chlorhexidine salt alone as the antimicrobial, and nowhere proposes that use of a chlorhexidine coating -- instead of the large amounts of chlorhexidine bulk distributed throughout the matrix of the Solomon’s catheters -- would successfully prevent infection caused by introducing such catheters into the human body.

9. Furthermore, Solomon would have discouraged a person of ordinary

skill in the art, such as a physician, from using a medical device that has been treated with chlorhexidine free base and salt – ostensibly in order to successfully increase chlorhexidine uptake and prolong antimicrobial efficacy. Any such claim would likely have met with suspicion by a practitioner in the field. Indeed, Solomon fully admits that chlorhexidine on the surface layer of the medical article would be rapidly released. *See* Solomon et al., col. 3 at lines 19-20. Accordingly, Solomon clearly would have directed a person of ordinary skill in the art to avoid using a medical device that had been treated only on its surface with a solution containing a mixture of chlorhexidine free base and chlorhexidine salt; otherwise face malpractice! In light of Solomon at that time, a medical doctor could not – under any circumstances – have attempted to implant a medical device having only a surface-treatment of chlorhexidine free base and chlorhexidine salt. On this premise, Solomon instead resorts to bulk distribution of chlorhexidine throughout the matrix of a catheter as a solution to the problem of providing long-lasting antimicrobial efficacy. *See* Solomon et al., column 3 at lines 21-22.

10. In direct contrast, the pending claims require a medical article that has been treated on its surface with a solution comprising both chlorhexidine free base and a chlorhexidine salt, and unambiguously demonstrates that a medical device treated only on its surface with such a mixture exhibit long-term antimicrobial activity. This finding was absolutely unexpected at the time of the invention, and would have been even more so in view of Solomon's observations that chlorhexidine was rapidly released from the surface of its treated medical articles.

11. In sum, I believe that Solomon's disclosure would not have suggested to a person of ordinary skill in the art (for example, a medical doctor) how to successfully achieve prolonged antimicrobial activity of a medical device by treating its surfaces with chlorhexidine, in particular treating the surface with the free base and water-soluble salt forms of chlorhexidine as required by the pending claims.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of any patent issuing from the above-captioned patent application.

2/25/05

Date

Shanta Modak  
SHANTA M. MODAK